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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/789,485 | 02/27/2004 | Thilo Stolze | 074313.0105 | 7994 |

7590 06/08/2006

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EXAMINER

ARENA, ANDREW OWENS

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2811

DATE MAILED: 06/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H/A

| | | | |
|------------------------------|-----------------|---------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/789,485 | STOLZE, THILO | |
| | Examiner | Art Unit | |
| | Andrew O. Arena | 2811 | |

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,8,9 and 11-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,8,9 and 11-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Power semiconductor module comprising elastic housing for accommodating movement of individual substrate regions on a heat sink.

Claim Objections

Claim 12 is objected to because of the following informalities: it depends from cancelled claim 6. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 8, 9, 13-17, and 19-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Fromme (EP 1 083 599).

Regarding the Fromme reference, the English language abstract section "Novelty" is relied upon for rejection purposes.

Regarding claim 1, Fromme discloses (Fig 3) a power semiconductor module (abstract ln 1) comprising a plurality of semiconductor components (21) situated on a substrate (20), wherein

the substrate is divided into a plurality of separate substrate regions (20) and one or a plurality of connecting regions (31) arranged in between (in a space intermediate to) adjacent substrate regions, wherein said connecting regions are designed to prevent a deformation of one substrate region to continue to an adjacent substrate region (Fromme is capable of preventing a deformation to continue).

Regarding claim 2, Fromme discloses (Fig 3) the connecting regions are formed by recesses (between circular portions of 31) in a module housing (32) enclosing said substrate portions.

Regarding claim 3, Fromme discloses (Fig 3) the material recesses are slotted (recess between circular portions of 31).

Regarding claims 8 and 9, Fromm discloses (Fig 3) the module housing, at least in the regions of the substrate regions, is such that it acts on the substrate regions with a spring force (all solids have an inherent elastic modulus, and exert a spring force on any contacting material).

Regarding claim 13, Fromm discloses (Fig 3) the power semiconductor module has a housing (32), which, in the region between the substrate regions, has action points for a mechanical pressure application of the connecting regions (any point between substrate regions can be regarded as an action point for a mechanical

pressure application), and the housing applies pressure to the individual substrate regions (abstract ln 5-6).

Regarding claim 14, Fromme discloses (Fig 3) a power semiconductor module (abstract ln 1) comprising

a plurality of substrate elements (20) having a top and bottom surface , each substrate element comprising a semiconductor component (21) arranged on the top surface of a substrate element;

one or a plurality of connecting regions (31) arranged in between (in a space intermediate to) adjacent substrate regions to form a continuous bottom surface (without breaks), wherein said connecting regions are designed to prevent a deformation of one substrate region to continue to an adjacent substrate region (Fromme is capable of preventing a deformation to continue).

Regarding claim 15, Fromme discloses (Fig 3) a module housing (32) enclosing said plurality of substrate elements.

Regarding claim 16, Fromme discloses (Fig 3) the connecting regions are formed by recesses (between circular portions of 31) in the module housing.

Regarding claim 17, Fromme discloses (Fig 3) the material recesses are slotted (recess between circular portions of 31).

Regarding claim 19, Fromm discloses (Fig 3) the module housing, at least in the regions of the substrate regions, is such that it acts on the substrate regions with a spring force (all solids have an inherent elastic modulus, and exert a spring force on any contacting material).

Regarding claims 20 and 22, Fromm discloses (Fig 3) a heat sink (30) having a flat (top) surface, wherein the continuous bottom surface of the plurality of substrate elements (20) and said plurality of connecting regions are arranged on said flat surface.

Regarding claim 21, Fromm discloses (Fig 3) the module housing (32) in the region between the substrate elements comprises action points for a mechanical pressure application of the connecting regions (any point between substrate regions can be regarded as an action point for a mechanical pressure application), and the housing applies pressure to the individual substrate regions (abstract ln 5-6).

Regarding claim 23, Fromm discloses (Fig 3) a power semiconductor module (abstract ln 1) comprising:

- a heat sink (30) having a flat (top) surface;
- a plurality of substrates (20) arranged on the flat surface of the heat sink;
- a plurality of semiconductor components (21) arranged on the substrates;
- on or a plurality of connecting regions (31) arranged (indirectly) on the flat surface of the heat sink between adjacent substrate regions, wherein the connecting regions are designed to prevent a deformation of one substrate region to continue to an adjacent substrate region (Fromme is capable of preventing a deformation to continue).

Claim Rejections - 35 USC § 103

Claims 4, 5, 11, 12, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fromme as applied to claims 1, 2, and 14 above, and further in view of Mikio (JP Pub 2001-118987).

Regarding claims 4 and 5, Fromme differs from the claimed invention only in not expressly disclosing “the substrate is a ceramic.”

Mikio discloses an analogous device on a ceramic substrate.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to choose a ceramic, as taught by Mikio, as the unspecified substrate material of Fromme; for at least the purpose of high heat dissipation (JPO machine translation of Mikio: [0003]).

Regarding claims 11 and 12, Fromm discloses the housing, at least in the regions of the substrate regions, is such that it acts on the substrate regions with a spring force (all solids have an inherent elastic modulus, and inherently exert a spring force on any contacting material).

Regarding claim 18, Fromme differs from the claimed invention only in not expressly disclosing “the substrate is a ceramic.”

Mikio discloses an analogous device on a ceramic substrate.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to choose a ceramic, as taught by Mikio, as the unspecified substrate material of Fromme; for at least the purpose of high heat dissipation (JPO machine translation of Mikio: [0003]).

Response to Arguments

Applicant's arguments filed 03/23/2006 have been fully considered but they are not persuasive.

Applicant's argument that "Fromme clearly shows that the elements [31] are not arranged in between the substrate regions but rather above the substrate regions" is not persuasive. "In between" has been interpreted as defined in the dictionary as "in a space intermediate to". Examiner maintains that Fromme clearly shows (Fig 3) a plurality of connecting regions (31) in between adjacent substrate regions (20).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

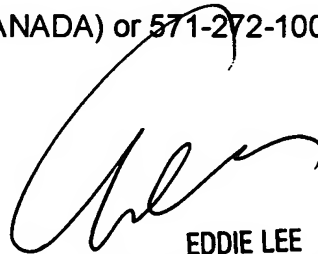
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is (571) 272-5976. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AOA
30 May 2006



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